# North American Willows.



~~On~~ north american willows. By Prof. N. J. Andersson, Stockholm

In attempting an enumeration of the Willows of North-America every author must feel himself rather at a loss. Any acquaintance, even the most superficial, with the different species of that genus is sufficient to ~~prove~~ show that a proper treatment of the subject ~~demands~~ requires ~~to get a perfect knowledge of the same it is quite necessary~~ not only ~~to have an~~ access to the richest collections, but also an opportunity of seeing almost every shrub for many years. Distributed over a great part of the surface of the globe, inhabiting a great variety of localities, ~~Most~~ the species of ~~this~~ ~~sort~~ genus ~~they~~ are exposed to the most heterogenous influences from all kinds of ~~a~~ soil, ~~weather, temperature~~ and all variations of climate, thus presenting a greater multiplicity of forms than most plants now known. The litterature of the subject also proves how very difficult it has been, and perhaps ever will be, to establish ~~a~~ certain determinations. While some authors believe that there are only a few species, others (as Schleicher, Tausch, Host, &c. ~~[illegible]~~) seem to think: "species tot numeramus, quot creata sunt ~~[illegible]~~ individua".

If then a botanist ~~feels puzzled to find his way out of the labyrinth formed by~~ most favorably situated for the purpose finds it no easy matter rightly to understand the Willows of his own limited native country, how embarassed must not a stranger be, who tries to form an exact idea of this intricate genus in a distant and extensive part of a New World, ~~where~~ which he ~~only~~ has ~~seen~~ seen only in one spot (California), and for ~~some~~ a few weeks? — But, as it ~~must~~ may perhaps always be impossible for ~~to~~ one person ~~to take a few notice of the~~ fully to examine ~~in a~~ living state the Willows ~~plants~~ of Lappland and in their native regions, Switzerland, the Pyrenees, Siberia, Himalaya and North America (not to speak of the tropical regions); and as it nevertheless is of ~~some~~ advantage to science to have a Synopsis of all the known species, constructed

upon the uniform principles, a botanist may hope to be favorably judged, when he undertakes to publish his views of these plants, after having studied them in several of their natural districts and in the largest collections.

For two years I occupied myself with the Willows in various regions of Lappland; I afterwards collected them in the Riesengebirge (Silesia), in Switzerland, and in many parts of the Continent and in England; I have consulted the herbaria as well as the botanical gardens of Paris, Berlin, Vienna; also the herbaria of Mr. De Candolle and of Sir W. Hooker (the latter the largest now existing and especially rich on plants from North America). For many years I have wished to publish some general remarks upon this genus, and Mr. Alph. De Candolle has lately honoured me with an offer to expound it for his celebrated Prodromus.

But, in arranging for such a work my annotations upon the northern species, I could best know how imperfect is our knowledge of the North-American forms. As the Willows especially belong to cold regions, why should they not be as numerous in America as in Europe or Asia? As they are with us so extremely subject to variations and to hybridisation (a fact now generally acknowledged), must it not be the same in the New World? To answer these and similar questions, our materials in Europe are not sufficient, and all the determinations, founded upon them alone, must be imperfect and liable to frequent mistakes. In this dioecious genus, it is very important to be sure that the specimens, both of leaves and flowers, belong to the same species and that the foliage, flowers and fruit should be taken from the very same shrub. But in herbaria the specimens—

gathered by travellers who generally care little for Willows, often are so imperfect, confused and miserable, that they only serve to make the study more difficult and uncertain.

If we look into the American Floras, published by various Authors since the time of Michaux, we find that the indigenous Salices of America (with exception of few of the most arctic) all have names totally differing from the European species. Now this was hardly to be expected, when the well-known fact is considered that the vegetation of a large part of the northern regions is, I dare not say quite identical, but very uniform or homogeneous all round the world. Hence, although the indigenous Willows in America generally are considered different from those in the Old World, we should look for a greater resemblance than has yet been recognized, not only in the higher arctic regions (partially shown in Hooker's Flora Boreali-Americana), but also in the more southern parts.

And, in fact, my inquiries have persuaded me that the similarity or analogy in this respect is greater than is generally supposed. With my experience of the European Willows, which frequently vary from one extremity of size, form and colour to the other, according to the area and which in different countries not seldom have the most different aspects (e.g. S. nigricans) (e.g. S. Lapponum and S. glauca in Lappland and Switzerland), I could not be surprised to find many American Willows equally varying from ours, although certainly belonging to European types, or at least so analogous to their European relatives that they might be considered as subspecies of them, till we discover the intermediate forms, which are the connecting links of that unbroken series, which we may consider as constituting a true natural genus.

This idea is it anything more than my individual opinion? It must be proved by others; it must be ascertained by diligent, ~~unpre~~ unprejudiced and accurate researches upon the living species in America and especially by a botanist who has acquired a profound acquaintance with the european species as older in the history of the science.

~~My~~

My esteemed correspondent,
^ Professor Asa Gray ~~to whom I am highly indebted not only for the most liberal communications of his admirable publications, but also for his generous~~ promised to assist me in procuring materials for a more complete treatise of this very difficult genus, has encouraged me to send him {an enumeration ~~a list~~ of the American species, already known to ~~by~~ me, {which ~~I is to dis I hope~~ he ^ may bring to the notice of ~~will be so kind as to communi-~~ {of the United States generally, in the hope ~~cate it to the~~ botanists ^ ~~who will favour me with contributions~~

(who has kindly)

that they may be induced to make renewed and critical observations upon the species indigenous around them, and also to favor me with contributions of specimens which are so greatly needed to perfect my contemplated revision of the entire genus for De Candolle's Prodromus.

I have tried to lay before the reader some of the reasons, why I must consider several ^ American species as very much allied ~~to~~ or perhaps identical with ~~to~~ ours in the Old World. But neither time at my command at present nor the space ^ ~~of a letter~~ has permitted me to treat the matter ~~to~~ at ^ the length ^ requisite ~~as it necessary~~ to prove the correctness of my opinion. I have also been obliged to (restrict this communication to ~~give~~ short diagnoses only for the new species here ~~are~~ proposed, and ^ to a few synonyms from the principal American Floras. Should this ~~report~~ essay fulfil its purpose of directing the attention of the botanists of the United States to this difficult genus, and bring forth the ~~ne~~ materials and the observations needed to dispel the many remaining doubts, the author may, perhaps, ^ hereafter find an opportunity of publishing, in ~~the~~ the ~~United States~~ the New World, a complete monograph of the North American Salices, and thus:

"reddat ad Dominum quod fuit ante suum!"

Stockholm, March 4, 1858.

## Enumeratio Salicum nobis ex America boreali cognitarum

### A. Americanae Fr.

I. Australes. Haec tribus, staminibus numerosis, filamentis subfasciculatis basi saepius hirsutis, antheris minutis rotundatis, squamis rotundatis tomentosis, capsulis plus minus longe pedicellatis et ovato-globosis, nectario subaciculari insignis, Amygdalinis omnino analoga, regionibus meridionalibus et tropicis fere propria videtur. Huc pertinent species omnes Africae et Americae indigenae, Indiae orientalis et Persiae pleraque (S. tetrasperma et affines) ~~et Persiae~~; nonnullae (S. Humboldtiana, S. Bonplandiana, S. Hartwegi &. Americam centralem ~~tr~~ transgredientes etiam Mexico australem incolunt.

1. S. nigra Marsh. – Asa Gray Manual 2 Edit. p. 417 n. 16. Hook. fl. bor. Amer. II. p. 148. n. 18. – S. ambigua Pursh. S. Houstoniana, S. caroliniana Michx – S. falcata Psh. (S. Purshiana Sp. S. ligustrina Michx. f.)

2. S. longipes Shuttlew. – pentandra; amentis lateralibus, pedunculatis, laxis; pedunculo foliato; capsulis ovato-globosis, glabris, pedicello nectarium bis superante, stylo subnullo, stigmatibus brevibus indivisis; foliis lanceolato-oblongis, demum glabris, subtus glaucis, reticulato-venulosis exstipulatis.

   – pubescens (S. gongylocarpa Shuttl.): capsulis subcrassioribus, ... fere longius pedicellatis; foliis utrinque hirsutis.

   Hab. prope St. Marks, Florida. Leg. Rugel.

Utraque forma non parum cum priori congruit, multis autem notis (foliis et stipulatis &.) sub ea differt. ~~Id id praesertim memorabilis videtur, quod S. nigram cum formis australioribus (S. Bonplandiana), S. occidentali et S. Humboldtiana) aperte conjungit.~~

3. S. amygdaloides n. sp. ~~amentis~~, triandra; amentis lateralibus, pedunculatis, ~~xx fragiles Fr.~~ rigidiusculis; pedunculo foliato; capsulis ovato-conicis, glabris, pedicello nectarium sexies superante, stylo subnullo, stigmatibus brevissimis partitis; foliis late lanceolatis, utrinque glaberrimis, subtus pallidioribus, margine glanduloso-serratis, exstipulatis.

   Hab. Missouri, Fort pierre (Prince Neuwied) Hb. Vindob.

Haec species, prae ceteris affinibus, S. amygdalinam nostram latifoliam refert. Habitu quasi hybrida ex S. lucida et S. nigra, huic fructibus, illi foliis omnino similis.

II) Fragiles Fr.

4. S. (pentandra*) lucida. – S. lucida Mühl. Asa Gray l.c. p. 417 n. 17. – Hook. l.c. p. 148 n. 17.

   – latifolia, foliis apice plerumque longe cuspidatis.

   – ovatifolia, foliis non vel ~~aut~~ abrupte ~~acum~~ cuspidatis

      – densiflora: capsulis condensatis majusculis, squamis subpersistentibus.

      In ripis lac. Winipeg. Hb. Bentham.

   – angustifolia

   – lasiandra Bth. squamis amenti glandulosis, filamentis basi subpilosis (California: Bigelow. Whipples expedition.)

*) foliis subtus passim rufo-pilosis.

- pilosa*. Columbia river. Winipeg-lake. Fort Franklin.

Primo obtutu haec species a nostra S. pentandra non parum differt; comparatis autem formis e variis partibus Americae et Europae, affinitas ne dicam identitas negari non potest. Etiam apud nos folia adsunt longe cuspidata, et et in America folia obtusiuscula, non lucida.

5. S. Fendleriana n. sp.; 3-5-andra; amentis pedunculatis, foliatis, erectis; ~~capsulis~~ squameis amenti masc. magnis, margine glandulosis; capsulis ovatis, glaberrimis, pedicello nectarium bis superante, stylo evidenti, stigmatibus minimis integris; foliis ovatis, acutis, utrinque glaberrimis, creberrime glanduloso-serrulatis; stipulis sat magnis, glanduloso-serratis.

Hab. in Mexico nova (Fendler: pl. Neo-Mex. n. 816) et "Rocky mountains" (Geyer n. 287.)

Habitu toto cum S. lucida maxime congruit, sed differt: capsulis brevibus et longius pedicellatis nec non foliis crebrius glanduloso-serrulatis, quibus notis etiam a S. amygdaloide dignoscitur, cui omnino analoga.

6. S. Wrightii n. vide infra.

~~6.~~ 7. S. alba L. – Asa Gray l. c. p. 416. n. 14.

- vitellina Ser. (= S. Pameachiana Barratt sec. Asa Gray – quam tamen ad S. fragilem sec. e speciminibus ducerem.)

- coerulea Ser.

~~7.~~ 8. S. viridis Fr. – S. fragilis praecifolia Barratt in Hook. herb.

A S. alba differt amentis longis acutis et flexuosis, ramulis subpendulis, foliis latioribus ~~longioribus cuspide recta acutata~~, utrinque viridibus et lucidis. A S. fragili ramulis tenacibus pendulis, foliis cuspide recta acutatis, maturis consistentia duriori-bus non sub prelo nigrescentibus, amentis erectis.

6. S. Wrightii n. sp. amentis pedunculatis, pedunculo foliis (2-3 oblongis obtusiusculis instructo; squamis facillime deciduis; nectario basin pedicelli, semicirculatim cingente; capsulis ovato-conicis glaberrimis, sat longe pedicellatis; pedicello capsulam dimidiam superante, gracili; stigmatibus sessilibus, integris; foliis anguste lanceolatis, longius acuminatis, tenuissime glanduloso-serrulatis, utrinque glaberrimis, subtus pallidioribus, stipulis caducis; ramis erectis, pallide testaceis, nitidis.

Hab. in Nova Mexico (N:o 1877. C. Wright. Coll. Neo-Mexic. 1851-1852.)

A ceteris hujus tribus speciebus differt foliis angustissimis (2-3 pollicaribus, vix 4 lin. latis), utrinque glaberrimis, amentis brevibus et crassis (vix pollicaribus). A S. alba vitellina – cui sane proxima – foliis et capsulis longe pedicellatis facillime dignoscitur.

8. S. fragilis L. – Asa Gray l. c. p. 416. n. 14. Hook. l. c. p. 148 n. 16.

- decipiens Hoffm. foliis obtusiusculis; cortice ramulorum pallide testaceo.
- Russelliana Sm. Arbor excelsa, foliis maximis, acutissime serratis.

III. Longifoliae. Amenta in ramulis lateralibus annotinis elongatis foliatis terminalia; squamae spathulato-lingulatae, apice saepissime glanduloso-denticulatae (Folia primaria pinnato-incisa.)

9. S. longifolia Muhl. – Asa Gray l. c. p. 417 n. 18. Hook. l. c. p. 149 n. 20. – S. rubra Rich. (sec. Hook.)

Jam cognitum est, nullam fere aliam Salicis speciem (S. cordata et S. vagante forte exceptis) in America crescentem tam miris variationibus ludere. Statura nunc bipedalis, nunc 4-5 orgyalis (qualem in California ipse vidi), nunc stricte erecta arboris instar, nunc humifusa vel repens, rami longius virninei aut breves subtomentosi cortice vario obducti; folia latitudine et longitudine, indumento et serratura eximie varia ut etiam amenta. His omnibus perspectis species sequentes (S. sessilifoliam, S. Hindsianam et S. taxifoliam) tantum ut formas australes et occidentales ejusdem per Americae regiones latissime dispersae speciei proponere vellem; quum autem in serie contigua a formis maxime latifoliis et vegetis ad minimas, microphyllas et pumilas membra adhuc desiderantur nonnulla, eas seorsim descripsi donec, quod hic autumavi, omnibus sit expertum. Inter formas autem numerosissimas Salicis verae longifoliae haec praecipue notanda:

- angustissima: amentis laxifloris et eximie remotifloris; capsulis squamas acutiusculas hirsutas primo non excedentibus, basi parum gibbis, subcylindricis, densissime sericeis, breve pedicellatis; foliis angustissimis et argute dentatis, exsiccatione fusco-nigrescentibus.

Hab. in Texas (Herb. Berland. n. 911, 3019, 2341, 2368) et Mexico nova (N:o 1875 Coll. C. Wright.).

10. S. sessilifolia Nutt. (herb. Hook.), amentis masc. unciatibus, crassiusculis, cylindricis, acutis, densifloris; squamis oblongo-ovalibus, filamentis triplo brevioribus et

pilis albis staminibus brevioribus dense vestitis, antheris post anthesin fulvescentibus; foliis pollicaribus, sessilibus exacte lanceolatis, medio semipollicem latis, acuminato-cuspidatis, utrinque dense griseo-tomentosis, (pilis sat longis subadpressis ~~sericeis~~ micantibus vestitis), integerrimis.

Hab. in Oregon (Mr Lobb. 1852).

+ Hindsiana Benth. pl. Hartweg. et Herb. – amentis brevibus (vix semipollicaribus), squamis acutiusculis dense tomentosis, antheris pallide flavis, capsulis breve pedicellatis e basi gibba longe rostratis rugulosis glabriusculis; foliis anguste lanceolatis, medio 2½–3 lin. latis, margine integerrimis utrinque adpresse sericeis.

Hab. in California (Hartweg).

Ad eandem seriem hoc ultima regionum subtropicarum incola etiam pertinet:

Salix taxifolia Hbk. K. Nov. Gen. & Spec. pl. II. p. 22 (1817) – S. microphylla Schlecht. & Cham. Linnaea VI. p. 354. (1831) – pulcherrima ~~species~~ ~~forma~~, ut mihi videtur formis supra memoratis haud dubie in S. longifoliam sensim abiens.

B. Helix Fr.

12 ~~11~~. S. purpurea L. – Asa Gray l.c. p. 415 n. 8. Hook. l.c. p. 148. n. 15.

13 ~~12~~. S. viminalis L. – Asa Gray l.c. p. 415 n. 9. Hook. l.c. p. 148 n. 14.

C. Vetrix Fr. Wimm.

I Temperatae (Subdaphnoideae).

14 ~~13~~. S. acutifolia Willd. – Ramum ~~floriferum~~ foliatum tantum vidi.

15 ~~14~~. S. (daphnoides +) irrorata ~~And~~ (n. sp.) amentis sessilibus, perulis ~~tantum~~ maximis primo bracteatis, valde condensatis, masculis brevibus, femineis horizontalibus, elongatis, densifloris; capsulis sessilibus, crasse conicis, glaberrimis, stylo producto, stigmatibus integris; foliis lanceolatis, utrinque viridibus; ramis densissime glauco-irroratis.

Hab. in Mexico nova (Coll. Fendler. n. 812).

Nostra S. daphnoidi ita est similis, ut nullis notis nisi amentis eximie condensatis et foliis (novellis!) integerrimis utrinque viridibus ab ea distingui possit. Squamae amenti masc. pilis brevibus aureis vestitae, squamae amenti fem. pilis sat brevibus griseis ciliatae, unde amenta fem. non ut in (vero) S. daphnoide longe pilosa conspiciuntur.

15. S. eriocephala Mchx. – Asa Gray l.c. p. 414 n. 5. ~~Hook~~

E Salicibus americanis haec mihi fere maxime ~~valde~~ obscura. Specimina numerosa, inter se etiam diversa ~~diversa~~ ~~differentia~~, nunc S. eriocephala Mchx, nunc S. crassa Barratt, nunc S. prinoides Psh (Hook. l.c. p. 150 n. 23), nunc S. cordata Wild. nunc immo S. myricoides inscripta a me examinata, confusionem tantum adhuc majorem reddiderunt, nec e diagnosibus auctorum quidquam certi eruere potui. Extant ~~Sunt~~ specimina gemmis maximis, oblique ~~ov~~ conicis, stipulis semicordatis et serratis, foliis sat longe petiolatis (petiolo basi dilatato gemmam amplectente) demum rigidis, subtus glaucis, margine argute serratis, supra saturate viridibus et lucidis nervis conspicuis percursis, amentis omnino nudis, masculis e gemmis erumpentibus pilis fulvo-aureis densissime villosis, squamis et staminibus pilis chryseis absconditis, am. femineis pilis cinerascentibus obtectis, stylo elongato v. ita omnino cum nostra S. daphnoide congruentia, ut, formis numerosis quibus ea apud nos mirum in modum luditur, perspectis, hanc ut formam parum aberrantem ~~tantum~~ haberem. Obstant autem rami rarissime glaucescentes, folia margine remotius serrata, praeque autem capsulae multo angustiores, distincte pedicellatae et sericeo-pubescentes. Extant ~~Sunt~~ etiam specimina quaedam, ad S. discolorem non indubie transeuntia, amentis magnis laxis et rarifloris, capsulis sat longe pedicellatis, foliis fere ut in S. grandifolia nostra, obovato-elongata, margine repandis et sinuato-dentatis. Maxime autem memorabilis videtur forma quaedam grisea foliis utrinque hirtis subtus sub ferrugineo-pilosis, ramis cinereo-villosis et amentis iis S. cinereae similibus stylo producto distincta. — Quibus ~~His~~ omnibus sequitur me de hac specie vix quidquam certi cognoscere, quare omnes rogo velint specimina varia, diligenter et accurate observare!

16. S. Bigelovii Torr. & Gray (Hb. Hook.); amentis sessilibus bracteis facillime deciduis paucis suffultis; capsulis ovatis, brevibus, obtusiusculis, glabris, ~~glabris~~ pedicello nectarium bis superante squamam subrotundam pilosam subaequante, stylo

elongato, stigmatibus brevibus, erectis, bipartitis; foliis ovali-obovatis integerrimis, subtus adpresse flavido-tomentosis, nigrescentibus.

Hab. in California: Bigelow. 1854.

Quoad foliorum formam et indumentum (quod tamen fusco flavescens) et amenta bracteata densiflora similitudinem quandam cum S. Coulteri habet; capsulae autem iis S. hastatae similiores. Unicum tantum specimen vidi.

17. S. lasiolepis Benth. Pl. Hartweg. et herb. – amentis sessilibus medio adscendentibus; squamis cuneato-subrotundis, tomento densissimo et brevi obtectis capsulas fere occultantibus; capsulis acutis, glaberrimis, pedicello nectarium bis superante, stylo mediocri, stigmatibus crassis, brevibus, integris; foliis lanceolatis vel late lingulatis, acutis, supra glaberrimis, subtus ferrugineo-glaucis, margine subsinuatis.

Hab. in California (on the banks of the rivers Salinas & Carmel near Monterey): Hartweg. n. 1955 (167).

Pulcherrima species inter Vetrices & Capreas quodammodo ambigua. Arbor dicitur 20-35 pedalis; rami crassiusculi, atri, novelli tomentosi. Folia 3-4-pollicaria, saepius semiuncia latiora, supra nitide viridia, subtus glauca integumento ferrugineo juxta nervos rubicundo colorata. Amenta mascula fere bipollicaria erecta, subflexuosa; squamae atrae, rotundatae, basi angustatae, pilis aureo-fulgentibus vestitae; filamenta squamas duplo superantia, antherae minutae oblongae etiam aureae. Amenta fem. vix breviora, sed subangustiora; squamae capsulas supra medium tegentes, densissime cano-tomentosae; capsulae lineales, flavo-virides.

18 S. Coulteri And. amentis omnino sessilibus, bracteis 2-3 suffultis; squamis fulvis, pilis albis longissimis dense hirsutis; foliis oblongis, supra obscure viridibus costa alba, subtus densissimo vellere lucido argenteo tomentosis, integris; ramis angulatis, dense griseo-tomentosis.

Hab. in California (Coulter).

Hanc speciem, cujus tantum tria specimina foliis rite evolutis et amentis masculis praedita vidi, non absque dubio affero; cum nulla a me cognita attamen confundenda, ob id praecipue insignis, quod S. eriocephalam cum S. lanata (mediantibus S. Hookeriana et S. ~~Grayi~~ speciosa) serie naturali aperte connectit.

II Arcticae v. Subarcticae

19 S. Hookeriana Barratt – Hook. l.c. p. 145. n. 5 tab. 180.

Amentis masculis S. daphnoidi similibus, amentis femineis S. hastatae, foliis autem S. lanatae!

20. S. (lanata)× americana: capsulis hirsutiusculis.

a. Barrattiana Hook. l.c. p. 146 n. 7. t. 181. – capsulis sericeis, foliis tomentosis magnis, amentis saepius lateralibus.

b. Richardsoni Hook. l.c. p. 147 n. 11. t. 182 – capsulis et foliis glabriusculis, foliis minoribus, amentis (sub)terminalibus.

In Lapponia S. lanata sub multis formis frequens occurrit; sunt quaedam his americanis tam similes ut nec habitu nec notis ullis distingui possint. Extant enim apud nos formae manifeste ad S. glaucam, sed optime ad S. hastatam accedentes, quarum folia glabrescunt, et amenta lateralia fiunt. Americana potius ad S. lapponum vergit; haec etiam multo humilior crescere videtur (praesertim S. Richardsoni!). E Sibiriae partibus variis etiam easdem variationes adsunt.

21. S. speciosa (Hook & Arn. Voy. Beechy) Hook. l.c. p. 145 n. 6. – Seemann Bot. of Herald p. 40 n. 189. t. 10.

Quamquam Salici cuidam S. amygdalinae affini, hoc nomen jam 1818 imposuit Host, id tamen huic speciei americanae conservandum censeo, utpote Salici omnium in regionibus borealibus crescentium facile speciosissimae aptissimum.

22. S. lapponum L. – Hook. l.c. p. 151. n. 32 (?) – S. Stuartiana Sm./ Hook. l.c. t. n. 31.

Fateri debeo me nulla specimina americana hujus speciei certa vidisse. Non sine haesitatione permulta ad hunc refero Salicem cum "pulchram", de

qua Chamisso (Linnaea VI. p. 543), a se in America arctica occidentali pluries lecta, mentionem fecit. Amenta sessilia, capsulae non pedicellatae, sed folia, fere ut in S. phylicifolia, utrinque acutata, viridia, subtus pallidiora, glaberrima. Stipulae persistentes, lineares. Unicum tantum specimen ex herb. Berolinensi vidi. Notandum est Salicem Lapponum, alpium Sumatrarum incolam, etiam folia nonnunquam habere glabrescentia.

23. S. candida Willd. – As. Gray l. c. p. 415. n. 9. Hook. l. c. p. 148. n. 14.

(D. Caprea Fr.

I) Cinerascentes Fr. Stigmata sessilia! Amenta praecocia, vix pedunculata!

24. S. (Caprea) × capreoides And. amentis sessilibus, bracteis paucis et minutis deciduis primo suffultis, densifloris; capsulis pedicellum 5ies superante, elongatis; foliis obovatis v. oblongis, basi angustatis, subtus glaucescentibus, pilis rufescentibus villosis, denique, nervis ~~rufis~~ exceptis, ~~calvis~~ glabris.

Hab. in California (Coulter) et Oregon (Ab. Hook.)

S. Caprea vera europaea, quantum scio, in America nullibi reperta, hac forma tam ibi optime repraesentat. Quod ad fructificationis partes vix ulla exstat differentia essentialis. Amenta mascula tamen angustiora, sed feminea crassiora, utrinque quam in nostra breviora; squamae fere majores atratae, ~~obovata~~ obovato-spathulatae; capsulae e basi gibbo fere cylindricae, 2½ lin. longae, stigmata sessilia erecta. Folia novella utrinque rufo-hirsuta, subtus etiam vellere albo plus minus denso obtecta, denique denudata, integerrima, dura. Gemmae ut in S. Caprea vera subglobosae, glabrae; rami saepius obscuri et glabri. – Proxima huic est sine dubio S. brachystachys; quae tamen differt amentis adhuc brevioribus, foliis densissime albo-~~tomentosis~~ velutinis.

~~In herb. Hookeriano specimina~~

25. S. cinerea L.?

In herbario Hookeriano specimina adsunt 2 ~~absque dubio~~ quantum videre possum ad

hanc speciem referenda quibus annexus erat ramus foliis parvis, glabris, omnino iis S. vestitae simillimis obtectus. Vereor ne ~~quod~~ confusione quadam commista sit! ~~Labellum his verbis inscriptum~~ Hab.: "thickets along rivulets Columbia-river valley near Fort Colville, 15-20 feet high, shrubby. C. A. Geyer". Num S. Caprea ~~aut~~ vel S. cinerea hic crescit?

26. S.+ brachystachys Benth. pl. Hartweg. et herb. - amentis sessilibus nudis, brevibus ovatis; squamis pilis longissimis sericeis dense vestitis; capsulis villosis acutatis, pedicello nectarium 4-5ies superante, stylo nullo, stigmatibus longis, integris, divaricatis; foliis obovatis, subtus densissime velutino-tomentosis, demum glabrescentibus, rufescenti-nervatis. +(aurita+)

Hab. in California (Woods near Monterey! Hartweg. n. 1957 (161)

Frutex dicitur 4-orgyalis. Sat similis videtur prioribus, sed differt: amentis brevioribus, squamis mediocribus rufescentibus pilis duplo vel triplo longioribus densissime sericeis, pedicello ~~capsulae~~ breviori, foliis 1½ unciam longis supra medium unciam latis, subtus mollius velutinis. E nostris speciebus in Europa indigenis S. aurita L. sine ullo dubio huic tam similis, ~~ut~~ hanc facile subspeciem ejus haberem.

Sub nomine S. Scouleriana Barratt - Hook. l. c. p. 145. n. 4 in herb. Hookeri ~~vidi~~ vidi specimina duo florentia ad S. brachystachyn absque ullo dubio pertinentia, et specimen foliatum S. sitchensis Sans. Hoc nomen itaque e Salicum turba excludendum!

27. S. vagans Ands.

Qui S. depressam Scandinaviae, S. Starkeanam Rossiae et Borussiae et S. rostratam Americae borealis ~~attente~~, earumque formas ~~fere innumeras~~ attente, nulla ~~judicia~~ ~~praeoccupa~~ ~~certa~~ certa opinione praeoccupatus, ~~ob~~ comparare studet, non potest quin eas omnes ad unam eandemque Salicum speciem pertinere credat. Hoc mihi saltem, specimina fere innumera e variis terris inspicienti, ~~ita~~ omnino persuasum habeo. ~~ut ne~~ Nominibus ~~specifici~~ jam allatis ~~jis~~ formas varias ~~~~ ~~~~ tantum ~~tantum~~ spectantibus, vagantis nomine speciem notare volui, quae per terras plurimas septentrionales late vagatur, quae

cinque notis admodum vaga est. Variat ~~f~~ statura, de qua Linnaeus in Flora lapponica n. 361, "arbor parva", sed in Flora suecica "arbuscula ad terram depressa"; variant folia nunc glabra nunc villosa, nunc magna nunc parva, nunc lanceolata nunc ovata v. obovata; rarissime autem variant amenta laxiflora, ~~spiciflora~~ capsulis angustis (glabris v. hirtis) subcylindricis longissime pedicellatis et stigmatibus sparsim ornata coronatis.) His praemissis hujus speciei formas sequente modo proponendas censeo:

1) ~~Int~~ Cinerascens: foliis velutinis

a. Linnaeana (Cfr. Fries Nov. Mant. I. p. 59) foliis plerumque obovatis supra demum glabratis. Linn. Lapp. n. 361 (sec. Fries) S. livida β cinerascens Wbg. Lapp. n. 273. – S. depressa α) cinerascens Fr. l.c. p. 57. S. depressa velutina Koch S. sphacelata Sm. (nomen ambiguum!)

– elata: crgyptis. Wbg. l.c.

– depressa: "foliis crassioribus utrinque tomentosis. S. depressa L. fl. suec. S. livida β in alpibus Wbg" Fr. l.c.

~~Hab.~~ ~~in~~ ex alpibus (forma depressa) ~~et~~ juxta flumina (forma elata) in regiones silvaticas Lapponiae descendens.

b. occidentalis: arbor 4–15-pedalis; foliis plerumque lanceolatis, demum rigidis et laeviusculis, sinuato-crenatis (fere ut in S. Caprea). – S. rostrata Rich. et Asa Gray l.c. p. 416. n. 12, Hook. l.c. p. 147 n. 9.

Hab. per Americam septentrionalem omnem et in Siberiae partibus orientalibus.

2. Glabrescens: foliis utrinque glaberrimis ~~lividis~~ lucidis, subtus pallidioribus.

a) intermedia: frutex parvus et humilis; foliis saepius late obovatis, subcoriaceis, amentis masculis tenuibus, staminibus flavis, pedicello capsularum nectarium bis superante.

– livida: foliis subtus livido-glaucis, capsulis glabris v. sericeis. S. livida α Wbg. S. depressa β Fr.

– bicolor: foliis subtus glaucis haud lividis. S. depressa γ Fr.

Hab. in regionibus mediis (livida) et meridionalibus (bicolor) Sueciae.

b) orientalis: frutex altior, foliis majoribus utrinque glaberrimis, margine sinuatis, amentis masculis crassioribus, staminibus fulvis, capsularum pedicello nectarium saepe/ quater superante. – S. Starkeana Willd.

Hab. in Siberia et prope Koenigsberg Borussiae nec non per Rossiam mediam et septentrionalem.

Et Asa Gray ~~&~~ et Hooker l.c. hanc speciem in America valde esse variabilem affirmant. Formas majores foliis fere ut in S. Caprea longis (sed multo angustioribus) obovatis et acutis, margine sinuatis, textura duris, subtus tomentosis, supra obscure viridibus in formas minores foliis lanceolatis aut obovato-oblongis, junioribus rufescenti-pellucidis, nervis subtus elevatis costatis abire vidimus, omnino ut S. depressa in Scandinavia ubi forma cinerascens altitudinem ~~bior~~ orgyalem sed f. livida vix bipedalem attingit." Has formas lividas et bicolores (S. vestitae) ex America non reperimus. Amenta mascula omnino ut in ~~et~~ S. Starkeana i.e. quam in vera S. depressa paullo longiora et crassiora, pilis fulvis squamarum magis hirsuta; amenta feminea vulgo quam in nostra longiores, sed capsulae omnino ~~eadem~~ aequales. Etiam in America margines silvarum et pratorum inhabitare dicitur.

28. S. ~~brevijulis~~ ~~And~~. Geyeriana n. sp.; amentis breve pedunculatis bracteis paucis suffultis, brevibus, subpaucifloris; capsulis ex ovata et crassa) basi conicis, tenuiter sericeis, pedicello nectarium bis superante, stigmatibus sessilibus cruciformibus; foliis lineari-lanceolatis, planis, utrinque molliter tomentosis integerrimis.

Hab. ad "Missouri and Oregon, Rocky mountains. C. A. Geyer n. 286".

Priori valde similis, sed differt habitu toto, ramis interdum glaucescentibus, foliis (novella tantum vidi!) multo angustioribus nec ullo modo obovatis, integerrimis, sed praecipue amentis ♀ triplo brevioribus, subrotundis, nec cylindricis et capsulis e basi valde crassa acutatis. Amenta mascula etiam breviora et crassiora, stamina magis aureo-fulva. Habitu amentorum propius ad S. repentem appropinquatur.

II Virentes. Amenta saepius pedunculata foliis v. bracteis suffulta; capsulae breviter pedicellatae, stylo producto; folia exsiccatione non nigrescentia.

29. S. Drummondiana Barratt – Hook. l.c. p. 144. n. 2.

Species pulcherrima, ramis elongatis nitidis castaneis vel rufis, amentis sessilibus et capsularum forma, magnitudine et indumento sequenti proxima et valde similis, sed dilatabunda foliis (quae iis S. lasiandr haud dissimilia) subtus vellere densissimo candido lanatis. Stylus in capsulis junioribus distinctus, stigmatibus bifidis aequilongus, in capsulis adultis magis productus videtur, tamen brevior (ac in S. discolore.

30. S. (phylicifolia*) discolor – S. discolor Mühl. Asa Gray l.c. p. 414 n. 4. Hook. l.c. p. 147 n. 10. – S. phylicifolia L. Asa Gray l.c. p. 418. n. 13.?
Specimina plerumque numerosa, quae attente examinavi, parum differt a vera S. phylicifolia, quali in Europae agrestibus crescit vulgatissima et eximie polymorpha, eique saltem exacte analoga. Folia quam in nostra majora, adulta rigidiora et margine irregulariter sed non profunde repando-serrata, stipulae in surculis et ramis novellis vegetis sat conspicuae, amenta omnino praecocia, capsulae angustae sericeae et squamae atrae, longe pilosae. In pluribus herbariis hoc species et S. eriocephala confusa; nullam aliam S. phylicifoliam ex America vidi, nisi forsan sequentem. – Nonne species apud nos loca alpina potissimum amans, quum in America regiones magis temperatas inhabitat, hoc modo mutatur?

31. S. phylicoides n. sp. amentis subsessilibus elongatis, crassiusculis; capsulis breve pedicellatis ovatis longe acutatis, tenuissime pubescentibus, stylo elongato integro, stigmatibus brevissimis indivisis; foliis lanceolatis acuminatis basi angustatis, margine integris, subtus pallidioribus nec glaucis.

— latifolia: foliis 3-4-pollicaribus, 1½ poll. latis, marg. subsinuatis.
— angustifolia: foliis 1-2-pollicaribus, ½ poll. latis, lanceolatis, integerrimis.

Hab. in arctica America occidentali (Awatcha Bay: Seeman). Hb. Hook.
Hanc aliam speciem mihi valde obscuram! Sit ita inter S. discolorem et S. cordatam intermedia ut fere eodem jure ad quamvis vel subspecies relata esse posset.

5. Cum priori congruit amentis longis, capsulis pubescentibus, stylo producto foliis elongatis acutis basi angustatis, sed differt: capsulis multo brevius pedicellatis stigmatibus crassioribus et foliis adultis vix rigidis nec subtus glaucis. Cum S. cordata communia habet stipulas basi latiores, folia subtus venulosa et capsulas viridiusculas. — Folia 2-3-pollicaria, amenta fere eadem longitudine, capsulae 2-3 lineas longae.

32. S. macrocarpa Nutt. - Ab. Hook. - amentis pedunculatis foliatis, erectis, capsulis breve ~~bre~~ pedicellatis, conicis, ~~sty~~ glaberrimis, stylo mediocri, stigmatibus integris; foliis exstipulatis lanceolatis integris glaberrimis subtus pallidioribus.

Hab. ad Hudson bay: Burke.

De ~~loco in dispositione~~ hac specie iterum non parum sum incertus, cui ~~habet~~ potissimum proxima censenda. Videtur frutex sat altus, ramis glabris. Folia iis S. phylicifoliae simillima, 1½ pollicem longa, semiunciam lata, acuta, basi angustata, matura rigidiuscula. Amenta feminea pedunculo foliis 3-4 rite evolutis instructo insita, pollicem longa subpauciflora. Capsulae ut in S. phylicifolia nostra, 2 lin. longae. A praecedentibus longe differt amentis pedunculatis et foliatis, cum sequentibus ~~parum communia~~ non multa communia, nisi cum S. glauca formis denudatis.

33. S. cordata Muhl. Asa Gray l.c. p. 415. n. 10. Hook. l.c. p. 149. n. 21.

In Europa hortis non raro colitur Salix haecce pulchra, foliis magnis, ~~d~~ rigidis, basi profunde cordatis, apice cuspidatis margine acute serratis insignis. Qui hanc formam tantum inspexit vix ullam ejus affinitatem cum S. hastata nostra ~~credeat~~ sibi fingerit, licet amenta et mascula et feminea huic omnino similia ~~sunt~~ conspiciuntur. Ceteras autem modificationes quibus ditata est ~~talis~~ terra americana usque ad septentrionem summum, quum viderit, facillime ~~intelligibit~~ intelliget has duas sibi valde esse analogas. Apud nos (S. hastata) frutex variat nunc orgyalis (in convallibus alpinis) nunc repens (in ~~plan~~ campis alpinis elevatis)

prostratus et bidigitalis; folia nunc latissime ovata, acuminato-cuspidata, acute serrata, stipulis magnis cordatis ornata, nunc autem anguste lanceolata integra exstipulata. Prorsus eadem modificationes etiam ex America vidi, quare eas hoc modo (serie analoga) disponere vellem:

| S. hastata | S. cordata |
| --- | --- |
| malifolia Sm.: fol. cordatis, stip. magnis = | rigida Muhl. |
| elegans Host: fol. ovatis, stip. mediocri = | myricoides Muhl. |
| alpestris (Fr.) fol. lanceolatis, stip. nullis = | subarctica |

S. cordata autem a S. hastata plerumque capsulis longius pedicellatis dignoscitur. Caeterum omnibus partibus simillima, praesertim foliis rigidis subtus dense venulosis, (character his speciebus valde singularis). Sub hac specie duas formas attulit Hooker l.c. 1) S. balsamifera Barratt 2) S. Mackenziana Barratt. Quantum e speciminibus in herb. Hookeriano judicare possum S. balsamifera, cujus ramus foliifer tantum adest, ad S. acutifoliam W. pertinet. Ramus cortice coerulescenti-castaneo obductus, stipulae lanceolatae, curvatae, gemmae magnae acutae, folia fere 4-pollicaria, semiunciam lata, argute sed remotiuscule serrata, subtus glaucescentia. – S. Mackenziana mihi hybrida proles ex S. cordata et S. vagante (rotundata) videtur. A priori habet folia glaberrima, viridia, elongato-cuspidata, capsulas basi gibbas glabras, stylum brevem sed evidentem, a posteriori foliorum forma magnitudinem et consistentiam, capsulas longissime pedicellatas.

34. S. adenophylla Hook. l.c. p. 146. n. 8.

Est sine dubio S. hastatae valde affinis; congruit enim cum ea: foliis subcordatis duris, subtus reticulato-venosis, argutissime serratis, stipulis magnis, pedunculis foliatis, capsularum forma et colore; sed differt abunde: foliis lana sericea densa primo obsitis, serraturis foliorum elongatis glanduligeris, capsulisque brevius pedicellatis.

35. S. myrtilloides L. – S. pedicellaris Pursh. Asa Gray l.c. p. 417 n. 19
Hook. l.c. p. 150. n. 26.

Jam cl. Tuckerman in The American Journal of Science and Arts. Vol. XLV 1843. p. 37. observavit speciem americanam cum lapponica valde congruere, nec possum quin ei omnino assentiar. Apud nos etiam species est vere elegantissima foliorum forma consistentia et colore nec non capsulis statim ab omnibus dignota. In America adhuc magis luxurians videtur; folia nempe multo majora et ovalia. Ad nostram certissime se habet ut S. rotundata ad S. depressam!

III Nigricantes Fr.

36. S. Barclayi n. sp. pedunculo foliato; amentis circumvolutis, densifloris, longe pilosis; capsulis glabris, conicis, in stylum longum integrum attenuatum, pedicello nectarium vix duplo superante, stigmatibus profunde bipartitis; foliis rotundato-ovalibus, brevissime oblique apiculatis, supra parcissime pilosis vel glabriusculis, subtus pallidioribus denudatis, reticulato-venulosis; stipulis ovatis, acutis, serratis.

Hab. in America boreali-occidentali: Kodiak (Barclay. Hb. Hook.)

Species ob id praecipue memorabilis, quod S. hastatae, S. nigricanti et S. glaucae simul sit affinis. Cum S. hastata congruit: amentis pedunculatis, squamis longe cinereo-pilosis, capsulis obscure viridibus glabris, stylo producto, foliis subtus subglaucescentibus et pulcherrime reticulato-venulosis, stipulis denique latis serratis; cum S. nigricante habitu, foliis exsiccatione nigricantibus et subtus (sub lente) crebre albo-punctulatis; cum S. glauca capsulis subsessilibus, pedunculo foliis 5-6, ceteris subsimilibus instructo, et consistentia foliorum. Ob hanc variam affinitatem locus in dispositione methodica difficilis determinatu.

IV. Argenteae Fr.

37. S. sitchensis Sans. ex Dec. Ledeb. fl. ross. III. p. 609.

Hab. in America boreali-occidentali: Sitcha (Mertens) Oregon (Scouler) et juxta Columbia-river (Hind).

Jam sub S. brachystachya observavi specimina S. sitchensis in herbario Hookeriano, S. Scouleriana appellata, quae aliis ipsa confusa.

38. S. grisea Marsh. – Asa Gray l. c. p. 414. n. 6.

Locus in dispositione methodica ambiguus. S. rubrae nostrae primo subsimilis, ob id ad Helices interdum ducta, ab iis + / staminibus discretis et capsulis pedicellatis longe diversa. Amenta, praesertim mascula, parva, subrotunda. Maxime affinis est sequenti, et per eam S. repenti nostrae.

+ amentis haud longe pilosis

39. S. petiolaris Sm. – Asa Gray l. c. p. 415 n. 7.

Amentis et foliis praesertim junioribus S. repenti L. vel potius S. rosmarinifoliae L. sat similis. Capsulae, quae in S. grisea obtusissimae et stigmatibus sessilibus coronatae, in hac ovato-rotundatae stylo distincto apiculatae; squamae in priore obtusae v. truncatae apice summo atratae, in hac acutae, superne infuscatae.

40. S. humilis Marsh. – Asa Gray l. c. p. 414. n. 3. S. Muhlenbergiana Barratt. & S. conifera Muhl. sec. Asa Gray.

E S. aurita et S. Smithiana quasi composita videtur. Ab utraque foliis amentis et capsulis aliena. S. tristis, huic maxime affinis, aperte differt foliis utrinque opacis cinereis, amentis femineis subglobosis et capsularum stylo evidenti.

41. S. tristis Ait. Asa Gray l. c. p. 413. n. 2.

– microphylla: foliis semiuncialibus, amentis (cauliis) globosis. Fruticulus parvus.

42. S. repens L. Asa Gray l. c. p. 418 n. 21. – S. fusca (L) Hook. l. c. p. 151. n. 28

Nullam veram S. repentem ex America in herbariis vidi. S. repens Bigel. Fl. Bost. (S. fusca Oakes), quam Tuckerman l. c. p. 35 S. ambiguam Ehrh. habet, ab utraque diversissima. ×)

×) ad S. arbusculam referenda.

43. S. gracilis And. = S. rosmarinifolia (L.) Hook. l.c. p. 144. n. 13. —

amentis lateralibus, bracteis paucis, deciduis suffultis; capsulis (ovato-)cylindricis, obtusis, tenuiter griseo-pubentis, pedicello nectarium 8ies superante, squamis lingulatis apice infuscatis, stylo brevissimo, stigmatibus duplo longioribus integris; foliis anguste linearibus planis integerrimis, basi longe angustatis latitudine fere decies longioribus, subtus pilis pallidis, glabris.

Hab. ad Saskatchawan (Drummond, dr. Richardson).

+ rosmarinoides: foliis apicem versus serrulatis, marginibus acutiusculis, subrevolutis.

Hab. Durham County (Ws. County).

Ab omnibus mihi cognitis speciebus bene dignoscitur foliis et capsulis. Inde hybri- da e S. vagante et S. myrtilloide videtur. et S. rosmarinifolia certissime longe recedit capsulis ~~longissime~~ valde pedicellatis, a S. vagante foliis linearibus ~~elongat~~ elongatis.

Varietas, ut etiam nostra S. gracilis ~~tabelle~~ "S. rosmarinifolia" ~~serrat~~ inscripta veram ~~nostram~~ accedit. Obstant autem capsulae ~~praedita~~, multo magis ad S. rosmarinifoliam longissime pedicellatae!

E. Chamelix Fr.

I Frigidae Koch.

44. S. glauca L.

~~Haec~~ species in Lapponia et Sibiria ~~et~~ innumeris formis (S. lanata, nigricante, myrsi- nitidi et aliis ~~accedentibus~~ affinibus) ludens vulgatissima et jam in Helvetiae alpibus ~~longe alia~~ aliena facies (S. sericea, S. albida x S. elaeagnoides (se induens) ~~formid~~ Ser.) in arcticis regionibus Americae habitu externo vix nostrae similis extat. Specimina tamen ab Seemann in parte occidentali lecta nec non e Rocky mountains reportata et a Lyall in Disco island cum nostris tamen ita congruunt, ut de ~~et~~ ~~identitate~~ affinitate non dubitare liceat. Folia nunc utrinque molliter villosa et incana, nunc denudata subviridia, amenta semper foliato-pedunculata, capsulae brevius pedicellatae. Hinc certissime ut forma tantum associanda.

- villosa - S. villosa (D. Don?) Hook. l.c. p. 144. n. 3. foliis tenuioribus supra glaucis sparse pilosis elevato-venosis, stipulis subpersistentibus lanceolato-linea- ribus, amentis sat longis erectis laxiusculis, subcaulifloris, capsulis vix demum denudatis,

stylo [illegible] ~~elongata~~ producto integro, stigmatibus brevibus ovoideis.

Haec forma speciei maxime vegeta videtur. Etiam in Lapponia omnino similis occurrunt specimina (S. glauca appendiculata Wbg. p. p.) ibique nullo crescendi modo a vera S. glauca distingui possunt.

~~Huc pertinet~~

+ S. desertorum Rich. Hook. l. c. p. 151. n. 30. amentis brevissimis (semipollicaribus) subglobosis, densifloris, capsulis ovatis dense lanatis, squamis ovalibus maxima parte obtectis, stylo bipartito fusco; foliis anguste oblongis, rigidis, subtus plus minus albo-tomentosis, subglaucescentibus, costa prominente flava et nervis elevatis ~~subtus~~ subreticulatis, supra sleprius viridibus, lucidis.

Insignis sane est forma in orbe vetere quantum scio nondum observata ~~[illegible]~~. Fruticulus videtur 1-2-pedalis; rami breves, robusti, foliis et amentis condensatis onusti. Squamae sat magnae capsulas magnam partem occultantes; stamina fulvo-aurea, Folia iis Salicis repentis haud absimilia. Transitus autem ad normalem S. glaucam nonnunquam reperti ~~[illegible]~~. Videtur itaque hujus ~~[illegible]~~ modificatio maxime frigida.

Monstrositatem hujus formae, ex Minto inlet ab Anderson lectam, vidi, ramis elongatis foliatis apice spicigeris ~~[illegible]~~ aberrantem.

45. S. arctica R. Br. – Hook. l. c. p. 152. n. 37.

Species sane difficilis determinatu, quasi inter S. myrsinitem et glaucam prorsus media et formas ~~vel species~~ plures ambiguas ~~[illegible]~~ amplectens. A S. myrsinite habet amenta plus minus elongata, crassa, squamas vulgo infuscatos, stylos semper longos, tenues, piceos vel atros, integros; a S. glauca folia virescentia ~~[illegible]~~, plus minus hirsuta, capsulas incano-pubescentes. Ab utraque tamen differt trunco procumbente ("frutex depressus" Br.) ramis ~~[illegible]~~ adscendentibus; foliis sparsis longius petiolatis, vere herbaceis vulgo obovatis integris, venis parum elevatis rugulosis*; amentis utriusque sexus spurie terminalibus i. e. ~~[illegible]~~ ramulos (~~pedunculos~~) breves villosos foliatos terminantibus. (~~ideoque ad glaciales nonnunquam referendi~~)

Vereor ne sub nominibus variis (S. myrsinites, S. retusa, S. ovalifolia, S. polaris etc.) formae variae hujus speciei saepe ab auctoribus descriptae sint. Notabiliores sunt

– subphylicifolia: foliis angustatis acutatis, utrinque glabriusculis. – Norton Sound (Seeman).

* subtus glauco-opacis

– subreticulata: trunco et ramis longe procumbentibus, apice tantum foliiferis (~~[illegible]~~), foliis elongato-obovatis, obtusiusculis, subtus reticulato-venulosis; amentis (terminalibus) 2-3 pollicaribus. – Hudson Bay, Mackenzie river etc.

– subpolaris: ~~[illegible]~~ biuncialis; ramis apice folia 3-5 emittentibus, quibus sequitur amentum semipollicare; squamis atris, truncatis, emarginatis. In litore maris arctici (Minto inlet: Anderson).

S. obovatam Psh. (Hook hb.) a S. arctica distinguere nequeo.

46. S. subcordata And. – S. cordifolia (Psh.!) Hook. l. c. p. 152. n. 36 p. p. (altera pars ad S. alpestrem pertinet!!)

amentis lateralibus pedunculatis foliatis; capsulis sericeis, ovatis, sessilibus, stylo bifido, stigmatibus partitis divaricatis; foliis rotundatis v. ovalibus basi cordatis v. subangustatis, utrinque glabris, subtus pallide viridibus, venoso-reticulatis, herbaceis, stipulatis.

Hab. "Rocky mountains" Drummond.

Frutex parvus, ramis erectiusculis nitidis castaneis, gemmis magnis. Folia adulta saepe biuncialia, longe petiolata (petiolo flavo, lucido) costa et nervis subtus prominentibus reticulata, margine glanduloso-serrulata absolete; stipulae cordatae; amenta subpollicaria, crassiuscula.

Quoad habitum quasi hybrida a S. cordata (~~[illegible]~~ cujus folia habet ~~et~~ sed breviora) et S. glauca (~~[illegible]~~ amenta!).

47. S. alpestris And. amentis lateralibus vel pseudo-terminalibus, pedunculatis foliatis; capsulis subsessilibus ovatis, albo-tomentosis vel subglabratis, nectario vix basin capsulae superante, stylo producto, saepe ad ~~basin~~ medium fisso, stigmatibus bifidis, laciniis revolutis; foliis oblongis v. subovalibus v. obovatis, ~~[illegible]~~ villosis, demum ~~[illegible]~~ glabratis.

Hoc nomine formas varias comprehendo, quae, ad unam speciem arctissime referendae, in variis terris suis nominibus ~~[illegible]~~ appellatae fuerunt; sunt:

a) pyrenaica ~~[illegible]~~ – S. pyrenaica Gouan! – In alpibus Pyrenaeis

b) helvetica ~~[illegible]~~ – S. ovata Ser. (quam tamen ad ~~S. myrsinites~~ ~~[illegible]~~ pertinere credidit), cet. Koch). – In Helvetia.

c) norvegica – S. pyrenaica norvegica Fr. – In Scandinaviae alpibus (Norvegia et Lapponia)

d) americana ~~cordifolia~~ – S. cordifolia (Ph.) Hook. l. c. p. 152. n. 36 p. p. – In arctica America.

Ab omnibus ~~S. glauca~~ formis etiam pygmaeis differt trunco subterraneo, ramis sub prostratis ~~adscendent~~ vel adscendentibus, foliis apice brevioribus apice obliquo, rigidioribus (ut S. myrsinitidem ~~sine~~ eo respectu fere simulat) subtus ~~venosis~~ venis elevatis rugulosis ~~elevatis~~, demum glabratis sed margine fere semper ciliatis, amentis laxioribus ~~foliis~~ omnino! costatis ~~pibus~~ foliis pluribus suffultis et capsulis distinctius pedicellatis.

Iisdem notis a S. subcordata recedit; a S. rhamnifolia et S. ovalifolia foliis utrinque acutis, amentis longis et foliatis, ~~foliis~~ velutinis vel saltem ciliatis, capsulis plerumque villosis.

48. (?) ~~S. pseudo-myrsinites And.~~ – S. myrsinites (L.) Hook. l.c. p. 151. n. 29.

In herbario Hookeri et ~~fo~~ hic dubio etiam in Flora ejusdem boreali-americana, sub hoc nomine confusae sunt plures species, quas seorsim describendas censeo:

*) Quam vito ~~lutricare~~ neque quam speciem ill. Hooker l.c. potissimum intellexit, specimina quae in herb. Ejus asservantur et mihi valde dubia restant, desquibenda puto:

S. pseudo-myrsinites A. amentis lateralibus foliis paucis bracteatis erectis, elongatis densifloris; capsulis pedicellatis ~~ovato~~-conicis glaberrimis testaceis, stylo distincto stigmatibus brevibus, pedicello squamam duplo et nectarium quadruplo superante; foliis oblongo-lingulatis, breve petiolatis, tenuiter membranaceis, utrinque glaberrimis, subtus subpallidioribus costa et venis prominulis nervosis, marg. crebre et depresse serrulatis.

Hab. "on the grand rapid of Saskatchawan" et in "Rocky mountains".

Frutex parvus 1-3-pedalis, ramis divaricatis, foliis 1½-pollicaribus vix ~~1½~~ pollicem latis (habitu fere S. myrsinitidis nostrae sed minus coriaceis, nec ita venulosis et argute serratis), amenta (fere ut in S. phylicifolia) bipollicaria; capsulae testaceae – Vix hic locanda!

S. ~~ichnostachya~~ brevijulis curtiflora A. amentis breve pedunculatis foliis 3-4 minutis suffultis, erectis brevibus; ~~amentis ca~~ capsulis ovatis glaberrimis viridulis, stylo distincto, stigmatibus brevissimis conniventibus, pedicello squamam atram apice crispato-hirsutam triplo et nectarium parvum quadruplo superantibus; foliis anguste ovalibus, utrinque glabris, exsiccatione nigricantibus, marg. crenulatis.

Hab. "Fort Franklin, Mackenzie river" Dr. Richardson.

A vera S. myrsinitide longe distat, habitu potius S. (cordatae) ~~hastatae~~ vicinior S.

nigricanti magis affinis. Fruticulus parvus; rami vix pedales; folia semipollicaria, 2 lin. lata, subtus punctis albis creberrimis subpallidiora; amenta semipollicaria, rachi pubenula; capsula minuta, viridula.

49. S. arbuscula L. (see the next page!)

~~49.~~ 50. S. rhamnifolia (Pall.?) Hook. & Arn. Beech. Voy. p. 117. t. 26. Ledeb. fl. ross. III. p. 612. — S. Uva Ursi (Psh.) Hook. l. c. p. 152. n. 38 (p. p.?) — S. myrsinites Chamisso Linnaea VI. p. 540 (ad sinum Sti Laurentii) — S. myrtilloides f. l. forma 1, 2. ~~tres~~ Cham. l. c. p. 539. — Huc forsan etiam pertinet S. unalaschkensis Cham. l. c. p. 541., quae tamen, nostrae S. hastato-herbaceae non dissimilis (sed folia integra!), S. rhamnifoliam et S. ovalifoliam quodammodo connectit.

Nomen Salicis Uva Ursi Psh., quod in herbario Hook. a Barratt huic speciei etiam ~~impost~~ impositum est, plane rejiciendum: 1) quod Pursh ipse specimina pulla et nunc valde incerta descripsit; 2) quod speciebus pluribus aliis ex montibus albis et Labrador, ~~val~~ valde recedentibus, fere eadem jure (si mancam diagnosin Purshii respicias) datum fuit. — Cum speciminibus ~~a~~ Salicis rhamnifoliae a Hook. l. c. primum descriptis et depictis nostra non male congruunt, sed recedunt nonnihil foliis vix spathulato-obovatis, margine subintegris, capsulis crassioribus et brevius pedicellatis. ~~Est~~ Sunt quasi inter S. myrsinitidem (cui capsulis subsimilis) et S. arbusculam (cui foliis) disponenda!

50 51. S. ovalifolia Trautv. Ledeb. fl. ross. III. p. 620. — S. Uva Ursi (Psh) Seemann Voy. of Herald. p. 40. — S. myrtilloides forma 4 Chamisso l. c. p. 539.

— major: ramis magis elongatis; foliis majoribus elongato-obovatis, acutiusculis subtus minus glaucescentibus; amentis ♀ crassioribus; capsulis majoribus. — S. myrtilloides forma 3. Chamisso. l. c. p. 539.

Hab. ad sinum Eschscholtz et Cap. Espenberg (in insula Sti Pauli (Chamisso), in Chamisso & Espenb.) America occident.-boreali (Seemann).

A ceteris facile distinguitur ramis flabellatim procurrentibus, foliis ½ - ¾ pollicem longis, vix ~~fere~~ eadem latitudine, ovalibus v. subrotundis, glabris, rigidiusculis, sub-

tus apice reticulato-venosis, amentis foliis fere duplo brevioribus densifloris, squamis castaneis apice rotundato infuscatis capsulas rufo-piceas glabras attenuatas ad medium tegentibus, stylo distincto, stigmatibus bifidis.

52 S. glacialis n. sp. amentis in ramulis annotinis lateralibus foliatis pedunculatis, ovato-globosis; capsulis ovatis sericeis sessilibus, squamam obovatam v. truncatam duplo superantibus, obtusissimis, stylo nullo, stigmatibus bifidis; foliis ovalibus, glabris, subtus glaucis, ~~marg. crenulatis~~ integerrimis.

Hab. in lit. maris glacialis ("between C. Barrow & Mackenzie river" Capt. Pullen.)

Hæc species, a Seeman l.c. S. Uva Ursi etiam ~~tabulis~~ subsumpta, a priori statim dignoscitur foliis multo minoribus (vix ¼ unciam longis v. latis) fere omnino rotundatis, omnino integerrimis, basi latioribus fere subcordatis (quæ etiam in herb. Hook. "S. myrtilloides" inscripta), amentis duplo brevioribus, capsulis ~~sessilibus~~ sericeis et stigmatibus sessilibus. – Radix (truncus subterraneus) latissime repens, rami horizontaliter decumbentes, subdigitales.

(to be introduced before S. rhamni folia)

50 S. arbuscula L.! – S. myrsinites (L.) Hook. l.c. p. 151. n. 29 p.p.

Formæ, quas e "Prince Alberts Sound" (H.M.S. Investigator: Miertsching) et "Rae River" (Dr. Rae) in herb. Hook. vidi a specie nostra alpina differunt foliis adhuc angustioribus, squamis ament. apice fuscis, capsulis subtenuioribus et stigmatibus subsessilibus. – Non possum etiam, quin ad hanc speciem illam referam formam, quam ~~l.c.~~ cl. Tuckermann (Silliman's Journ. 45. p. 35) ut S. ambiguam Ehrh. descripsit (= "S. repens ~~Oakes~~ herb. Oakes.")x Amentis pedunculatis foliatis, squamis capsulas basi tegentibus flavidis, stylo ~~distincto~~ producto, ~~et habitu~~ foliis lingulatis integerrimis et habitu toto ab omni S. ambigua ~~recedunt~~ dignoscitur. Ab S. arbuscula tamen recedit foliis pilis longis adpressis subtus dense sericeis et integerrimis. – Huc etiam referendi:

– labradorica: foliis pollicaribus, 3 lin. latis, costa lutea flavescente subtus notatis, margine sæpe remote serratis, subtus parcissime pilosis. – Labrador.

x) In Europa ill. Wimmer et Krause ~~nonnulli quidam~~ hanc speciem e S. repente et S. amita (quæ forma in America non inventa!) prolem hybridam habent.

## II Glaciales.

53. S. (retusa*) phlebophylla Anders. – S. retusa (L.) Hook. l.c. p. 153 n. 39. – Seeman l.c. p. 40.

– major: folia obovata, ~~subconcava~~, integerrima, semiunciam longa supra medium fere eadem latitudine, supra planiuscula subtus nervis arcuatis elevatis striata, exsiccatione fusco-viridia; amenta pollicaria densiflora; squamæ parvæ ciliatæ; capsulæ ovato-conicæ, glaberrimæ, rufæ, pedicello squamam ~~fere duplo~~ parum et nectarium fere duplo superante pedicellatæ; stylus pedicelli dimidia longitudine. – In America occident. boreali (Seeman.)

– media: folia oblonga v. subovalia basi subangustata, semiunciam longa, 3-4 lin. lata, nervis elevatis subarcuato-parallelis utrinque costata; amenta semipollicaria, crassa subclavata; squamæ obovatæ atræ longe albo-pilosæ ~~basin~~ capsulæ attingentes; capsulæ e basi crassa conico-rostratæ, glaberrimæ, rufescenti-sanguineæ, pedicello nectarium vix superante pedicellatæ; stylus pedicello longior, tenuis, integer; stigmata ~~apice~~ bifida, divaricata. – Cap Mulgrave: Beechy. Arctic coast: Dr. Richardson.

– minor: folia ovalia l. oblonga 2-3 lin. longa ~~et lata~~, nervis ~~reticulatis~~ rectiusculis parallelis validis percursa (qui nervi, diachymate mox toto evanescente, retis instar soli persistunt); amenta minima minuta foliis apicalibus abscondita; capsulæ glaberrimæ, rufescentes, subsessiles, stylo mediocri.

Has tres formas, ~~tibi~~ inter se non parum dissimiles, nullo modo distinguere valeo, quia seriem contiguam a ~~forma~~ statura majori ad minimam, pusillam efficiunt. Sunt semper fruticulus depressus, ramis ad maximum digitalibus plerumque valde foliatis. A vera S. ~~retusa~~ retusa, qualem ex Helvetia bene recognosco, certe quidem nonnihil differt; hæc ~~aut~~ etiam eandem ~~et~~ habet seriem formarum a S. Kitaibeliana Willd. (foliis majoribus) ad S. serpyllifoliam Jacq. (foliis perpusillis), toto habitu et consistentia et nervatione foliorum huic nostræ omnino analoga. – Forma major maxime ad S. rhamnifoliam habitu fruticuli et foliorum accedit, sed differt: amentis exacte terminalibus, foliis nunquam serrulatis, adhuc rigidioribus.

54. S. Cutleri Tuckerman (Silim. Journ. 45. p. 36) — S. Uva Ursi Asa Gray l.c. p. 418.

– major: foliis obovato-ovalibus fere semipollicaribus, amentis eadem ~~longitudine~~ pollicaribus

– minor foliis 3 lin. longis adhuc angustioribus, oblongis; amentis semipollicaribus.

In speciminibus a me examinatis (et a Tuckermann ipso communicatis) amenta semper terminalia; am. mascula (quorum stamina ~~sup~~ singula + descaribuntur) non vidi; nomen ob staturam humillimam et compactam depauperata? Cum S. retusa Europae meridionalis plane nihil commune habet; potius modificatio maxime alpina S. myrtilloidis (S. pedicellaris Am.) esset judicanda!

55. S. ~~myrtifolia~~ myrtillifolia n. sp. amentis in ramulis annotinis terminalibus, foliis occultatis vix semipollicaribus; capsulis brevissime pedicellatis minutis, late viridibus glaberrimis anguste conicis, pedicello squamam angustam apice nigram glabriusculam subaequante, stylo subnullo facile caduco, stigmatibus brevissimis integris; foliis semiunciam longis, 2-3 lin. latis, ovalibus, utrinque pallide viridibus et glaberrimis, margine ~~runcinato~~ crenulato-serrulatis, novellis (nigrescentibus tenuitate)

Hab. "Rocky mountains, east side, lower situations" (Hb. Hook.).

Fruticulus trunco parvo superne ramoso, ramis strictiusculis fere omnino ut in Myrtillo nigro, cui insuper foliis pure viridibus, tenuibus, marg. crenulatis ovali-subrotundis eximie similis.

56. S. reticulata L. – Hook. l.c. p. 151. n. 33.

a) vestita (Psh) Hook. l. c. p. 152 n. 35 – foliis subtus pilis longis densis ~~oft~~ sericeis

– grandifolia: frutex fere bipedalis, ramis strictiusculis, foliis 2-pollicis longis, ~~tot~~ supra medium 1½ p. latis; amentis fere bipollicaribus, ~~pilis sericeis densis~~ (subtus demum omnino glabris.) (Etiam in Sibiria)

– parvifolia: fruticulus, ramis adscendentibus; foliis oblongo-ovalibus v. ellipticis, subtus densissime albo-sericeis (Etiam in Helvetia)

b) normalis. – S. ~~retic~~ reticulata L., ~~qualis~~ quae in Europae alpibus vulgaris.

c) nana – S. nivalis Hook. fl. l.c. p. 152. n. 34. – pygmaea, ramis stib-

digitalibus v. policaribus; foliis 2-4 lin. longis latisque habitus etiam omnino nudis cano-albis pulchre venuloso-reticulatis, amentis linearibus e floribus 3-6 compositis, squamis obovato-rotundatis glabris venosis. – (Etiam in Grönland & Spitzbergen)

Qui hybridas formas etiam sponte facile procreatas credit formam grandifoliam S. vestita s.d. e S. reticulata et S. lanata, et S. nivalem s.d. e S. reticulata et S. herbacea ortam conjiciat. Formis innumeris hae extreme inter se connexa nullo modo specie distingui possunt.

57. S. herbacea L. Asa Gray. l.c. p. 418. n. 22. Hook. l.c. p. 153. n. 40.

58. S. polaris Wbg. Hook. l.c. p. 153. n. 41.

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From this list of the North-american willows (from which I have excluded those more tropical forms growing in Central-America, the South of Mexico and Texas and the cultivated ornamental S. babylonica) we may find that they amount to a number of 58 species (or rather 59, as two are proposed under S. myrtini-tes), while the Scandinavian – and almost all the european – very probably do not exceed 45. These 59 american species, when compared with the european as to their affinities, may be classified in the following five groups:

I. Those which are common to the old and the new world.

a) perfectly identical though very often more varying in America than here.

α) Transplanted from Europe for cultivation:

S. alba S. fragilis S. acutifolia.
S. viridis S. purpurea S. viminalis.

β) Arctic or alpine species

(S. aurea?) S. lanata S. arctica S. vagans S. reticulata S. arbuscula
S. lapponum S. glauca S. alpestris. S. myrtilloides S. herbacea S. polaris

b) So analogous with european species, that they (at least most forms of them) can not be distinguished from ours. – From the middle parts of America.

S. lucida analogous to S. pentandra. S. capreoides anal. to S. Caprea. S.
S. irrorata " " S. daphnoides. S. cordata " " S. hastata

b) Having forms very little differing from the ours

(S. cinerea ?) S. glauca S. arctica

S. lapponum S. lanata S. alpestris.

II. Those which, very widely distributed over the middler parts of America, seem so analogous with european species, that they (at least some forms of them) can not be distinguished from them, or may be considered as subspecies.

S. lucida analogous to S. pentandra S. phylicoides anal. to S. phylicifolia S. capreoides anal. to S. caprea
S. irrorata " " S. daphnoides S. cordata " " S. hastata S. phlebophylla " " S. retusa.

III Those which certainly in characters differ so much from european forms that they may still be considered as species, though belonging to types, which in the old world produce fewer forms:

| | | | |
|---|---|---|---|
| S. Fendleriana related to S. pentandra | | S. humilis } related to S. repens | |
| S. wrightii " " S. alba | | S. tristis } | |
| S. amygdaloides " " S. amygdalina | | S. gracilis " " S. rosmarinifolia | |
| S. eriocephala " " S. daphnoides | | S. subcordata " " S. glauca | |
| S. brachystachys " " S. aurita | | S. pseudo-myrsinites } | |
| S. discolor } " " S. phylicifolia | | S. curtiflora } " " S. myrsinites | |
| S. macrocarpa } | | | |
| S. Geyeriana " " S. vagans | | S. Cutleri " " S. myrtilloides? | |

IV Those which may also be regarded relative to types in our regions, but with greater reason than the above enumerated must be considered different, ~~and peculiar~~.

S. Bigelovii } belonging to the type of S. daphnoides S. candida belonging to the type of S. lapponum
S. lasiolepis } S. Drummondiana " " " " " S. laurina
S. Coulteri } S. adenophylla " " " " " S. hastata
S. Hookeriana } " " " " " S. lanata S. Barclayi " " " " " S. glauca
S. speciosa }

V. Those which certainly form types peculiar to the American regions:

1. S. longifolia, S. sessilifolia (+ Hindsiana and S. taxifolia). Corresponding in Europe S. riparia and its varieties. – To which may be added S. nigra and S. longipes belonging to a type peculiar to the southern or tropical countries.

2. S. sitchensis, S. grisea and S. petiolaris compensations, as it were, in America for our S. mollissima mixed with S. repentes (Obs. S. angustifolia Wulf. is by Prof. Wimmer and others considered here a hybrid of S. repens and S. viminalis !)

3. S. rhamnifolia, S. ovalifolia, S. glacialis and S. myrtillifolia purely arctic forms, only corresponding with several from the northern parts of the cold Siberia.

From all this we find ~~that~~ of the 58 species growing in North-America there are
12 identic with European species
6 nearly so.
6 very analogous to . . . .
15 distinct species but belonging to the same types as the european.
9 almost peculiar to America
10 really " " " "

If on the other hand we examine the Scandinavian species and types (in order to find which of them are wanting in America, we see that such are

1) 8 species, more or less generally cultivated in the whole Europe and probably of a more southern origin:

S. undulata S. rubra S. lanceolata (S. stipularis)
(S. hippophaefolia) (S. mollissima) S. Smithiana (S. holosericea)

of which the four species of some botanists are considered hybrids.

2) only one species, which grows wild in our country and here ~~and~~ as in Switzerland forms such a ~~variety~~ quantity of varieties, ~~that~~ Schleicher has formed nearly 100 species of this one, viz. S. nigricans, a really European species. (S. canescens, S. vesifolia S. ambigua by many botanist are ~~thought~~ to be hybrid forms.) – To these may be added from the rest of Europe S. silesiaca (almost peculiar for Silesia) S. glabra ~~peculiar~~ for Austrian alps) S. grandifolia and S. Seringeana (~~almost peculiar~~ for Switzerland) S. riparia ~~incana~~ ~~and~~ S. caesia) (and S. pedicellata in Italy and Spain

If ~~now~~ we now sum up the results drawn from our computations, namely, that of the 58 American species 24 are identical to the european, 24 belong to the same types and ten only, western or arctic forms, seem to be peculiar to this great continent; and further, that of the Scandinavian Flora only one wild growing species or type is not yet found in America (a type which in fact looks as composed of almost every one else) but 48 more or less related species or types are common to both the old and the new world — in which (America) they are more luxuriant and varying and where we also find a number of other types —; it seems to me, that we may conclude, that America is the chief abode, and perhaps the native country of the willows; and thus it may be considered as a duty for the American botanists, to apply themselves to this genus and its intricate forms.

Science, who does not like hypotheses as much as facts, has not yet got sufficient materials to tell us if and by what means and in what ways the original species first were spread from single centra over the distant parts of the earth; but all we know from the arctic and northern regions bear upon that fact, that their vegetation is very homogeneous. I have tried by these remarks to prove, ~~this~~ with regard to willows, that there are many links connecting Europe and America.